Trend Study 17-43-97

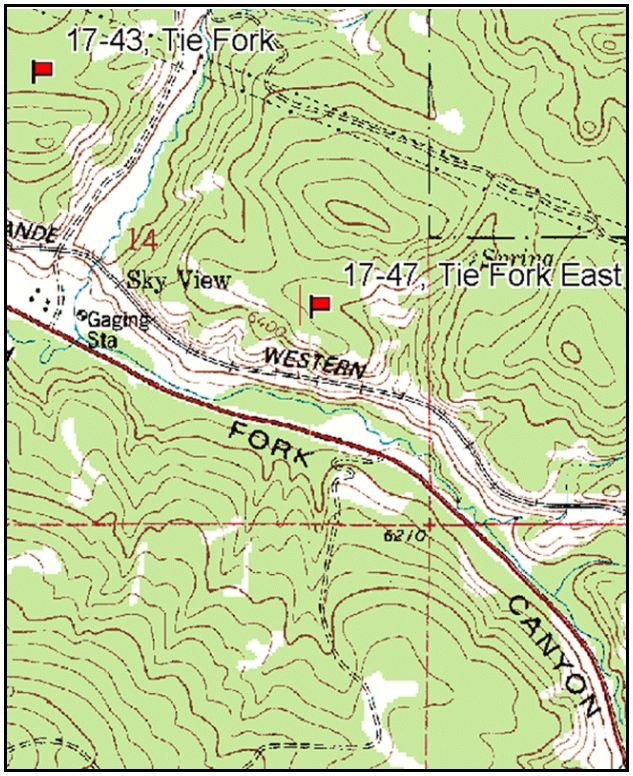
Study site name: Tie Fork . Vegetation type: Pinyon-Juniper .

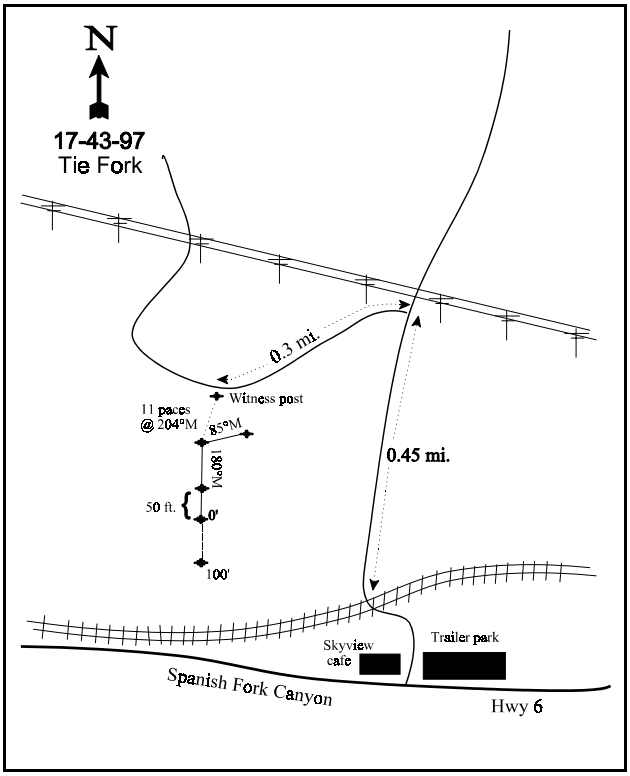
Compass bearing: frequency baseline 180 degrees magnetic (line 4 @ 85°M).

Frequency belt placement: line 1 (11 & 95 ft), line 2 (34 ft), line 3 (59 ft), line 4 (71 ft).

LOCATION DESCRIPTION

From the intersection of the road in Spanish Fork Canyon and Tie Fork, proceed north up Tie Fork to where the road crosses the railroad tracks. From the railroad crossing, continue northward up Tie Fork for an additional 0.45 miles to an intersection just before the power lines. Turn left (west) and proceed 0.30 miles to where the road turns sharply northward. A stake is located on the left side of the road just before the bend. From the stake, the 300-foot baseline stake is located 11 paces away at an azimuth if 204 degrees magnetic. The study is marked by green steel "T" fenceposts approximately 12 to 18 inches in height.





Map Name: Tucker Diagrammatic sketch

Township 10S , Range 6E , Section 14

DISCUSSION

Tie Fork - Trend Study No. 17-43

***SUSPENDED - This site was suspended in 2002. It has been replaced by Tie Fork East (17-47) a better, more representative site.

This study is located on deer winter range in lower Tie Fork Canyon. Much of the surrounding area is badly eroded and depleted of quality forage plants. This site is a poor representation of winter range (perhaps the reason the site was not inventoried in 1989) and should be closely looked at before sampling again in the future. Typically, juniper-pinyon predominates but is interrupted periodically by mountain brush slopes and sagebrush in the canyon bottoms. The study samples a slightly more productive juniper-pinyon type located on a moderate north facing slope (15-20%) at an elevation of 6,200 feet. Deer pellet group frequency was moderately high in 1997 (35%). During 1983, two deer carcasses, three antler drops, and at least 12 sets of deer legs were observed. During 1997 deer legs were again encountered and likely came from a nearby deer camp.

Soil is in relatively good condition when compared to surrounding south and west slopes, which are badly eroded and support almost no understory species. Textural analysis indicates a sandy clay loam with an effective rooting depth of almost 18 inches. Phosphorous could be limiting to plant growth and development with a value less than 10 ppm (8.7 ppm). Erosion is rapid enough to quickly move pellet groups and loose litter downslope, but this is localized and not wide spread.

Browse composition is divided into two levels of availability. Juniper and pinyon are abundant but largely unavailable because of excessive height. Point-center quarter data estimates 212 Utah juniper trees/acre, 33 pinyon trees/acre, and 27 Gambel oakbrush stems/acre. Most of the available browse comes from sub-dominant shrubs such as mountain big sagebrush, snowberry, stickyleaf low rabbitbrush, low growing Gambel oak, Saskatoon serviceberry, Wood's rose, true mountain mahogany, and an occasional antelope bitterbrush. The key preferred management species are mountain big sagebrush and true mountain mahogany. Together they only provide 3% of the total browse cover. Both were reported heavily hedged in 1983, but now exhibit light to moderate hedging. In 1983, mountain big sagebrush had poor vigor and consisted primarily of decadent plants. Vigor has improved, although 50% of the population are still classified as decadent. Currently the dead to live ratio is almost two dead for every live plant. Mahogany is in better vigor with only mature plants classified. The population is much less than originally estimated, but this is because of the much larger sample sized giving significantly better estimates for shrub populations that have discontinuous distributions. There are no dead plants in the population to explain the decline. Actually, snowberry provides a significant percentage of the forage as it contributes to 29% of the total browse cover and shows light to moderate use and good vigor.

Nested frequency for grass species has increased significantly since 1983. Many more palatable grasses that were not present in 1983 were now sampled. Nearly all grasses have significantly increased in nested frequency. The principle species include bluebunch wheatgrass, Kentucky bluegrass, Indian ricegrass, and crested wheatgrass.

Similar to the grasses, forb nested frequency has also greatly increased. The most common species include longleaf phlox, starwort, Hoods phlox, Utah fewflower peavine, and blue-eyed Mary. Utilization of forbs is uniformly light.

1983 APPARENT TREND ASSESSMENT

Although in better condition than most of the surrounding area, the study site still appears to be in a state of decline. The rate of soil erosion although steady, is not rapid. However, it is great enough to prevent any significant litter buildup. Vegetatively, juniper and pinyon appear to continue to thicken, while mountain big sagebrush is declining. Other browse species appear stable, or in some cases, even increasing. The herbaceous understory appears stable.

1997 TREND ASSESSMENT

Erosion is still slight and will probably always occur on this site due to the majority of the vegetative cover being aerial cover not herbaceous cover. Protective cover closer to the ground is more effective than aerial cover. Soil trend is stable. Browse trend is stable. Mountain big sagebrush vigor has improved, although there are currently more dead plants than live plants. The age structure for most species indicate stable populations with little biotic or recruitment potential. The herbaceous understory trend is upward with an increase in nested frequency for grasses and forbs. Many new grasses were encountered in 1997 that were not previously encountered.

TREND ASSESSMENT
soil - stable (3)
browse - stable for key species (3)
herbaceous understory - up (5)

HERBACEOUS TRENDS --
Herd unit 17 , Study no: 43

Type	Species	Nested Frequency '83	Nested Frequency '97	Quadrat Frequency '83	Quadrat Frequency '97	Average Cover % '97
G	Agropyron cristatum	a3	b32	1	12	.93
G	Agropyron spicatum	79	110	39	38	3.11
G	Bromus tectorum (a)	-	19	-	7	.09
G	Oryzopsis hymenoides	a3	b50	2	20	1.44
G	Poa fendleriana	a-	b21	-	10	.20
G	Poa pratensis	51	59	24	19	1.62
G	Stipa comata	a-	b27	-	10	.81
G	Stipa lettermani	a-	b24	-	9	.34
Total for Annual Grasses		0	19	0	7	0.09
Total for Perennial Grasses		136	323	66	118	8.46
Total for Grasses		136	342	66	125	8.55
F	Achillea millefolium	24	18	11	8	.31
F	Agoseris glauca	a-	b18	-	7	.03
F	Alyssum alyssoides (a)	-	11	-	6	.17
F	Allium spp.	-	1	-	1	.00
F	Androsace septentrionalis (a)	b35	a4	19	2	.01
F	Arabis spp.	6	-	4	-	-
F	Astragalus convallarius	11	24	6	12	.25
F	Calochortus nuttallii	-	2	-	2	.01

Type	Species	Nested Frequency '83	Nested Frequency '97	Quadrat Frequency '83	Quadrat Frequency '97	Average Cover % '97
F	Collomia linearis (a)	-	9	-	3	.01
F	Collinsia parviflora (a)	-	78	-	32	.33
F	Cymopterus spp.	$_{a}$-	$_{b}$17	-	8	.12
F	Cynoglossum officinale	8	-	3	-	-
F	Delphinium nuttallianum	$_{a}$-	$_{b}$33	-	17	.11
F	Eriogonum umbellatum	4	8	3	4	.09
F	Geranium spp.	12	1	5	1	.00
F	Hackelia patens	3	6	1	2	.06
F	Ipomopsis aggregata	-	3	-	1	.00
F	Lathyrus pauciflorus	50	47	20	17	2.27
F	Machaeranthera canescens	7	-	3	-	.00
F	Penstemon caespitosus	$_{a}$-	$_{b}$26	-	11	.64
F	Phlox hoodii	$_{a}$31	$_{b}$57	13	21	2.21
F	Phlox longifolia	$_{a}$20	$_{b}$105	8	40	.85
F	Polygonum douglasii (a)	-	4	-	2	.01
F	Schoencrambe linifolia	-	5	-	2	.03
F	Senecio integerrimus	-	4	-	4	.02
F	Solidago spp.	$_{b}$26	$_{a}$1	12	1	.03
F	Stellaria jamesiana	$_{a}$-	$_{b}$79	-	26	1.83
F	Taraxacum officinale	-	6	-	3	.04
F	Tragopogon dubius	-	2	-	1	.00
F	Viola spp.	-	5	-	4	.02
Total for Annual Forbs		35	106	19	45	0.54
Total for Perennial Forbs		202	471	89	194	9.00
Total for Forbs		237	577	108	239	9.54

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Herd unit 17 , Study no: 43

Type	Species	Strip Frequency '97	Average Cover % '97
B	Amelanchier alnifolia	1	-
B	Artemisia tridentata vaseyana	8	.33
B	Cercocarpus montanus	2	.15
B	Chrysothamnus depressus	6	.21
B	Chrysothamnus viscidiflorus viscidiflorus	40	4.14
B	Juniperus osteosperma	15	5.94
B	Opuntia spp.	4	.03
B	Pinus edulis	1	.15
B	Quercus gambelii	21	2.44
B	Rosa woodsii	4	-
B	Symphoricarpos oreophilus	70	5.63
B	Tetradymia canescens	1	.15
Total for Browse		173	19.19

CANOPY COVER --
Herd unit 17, Study no: 43

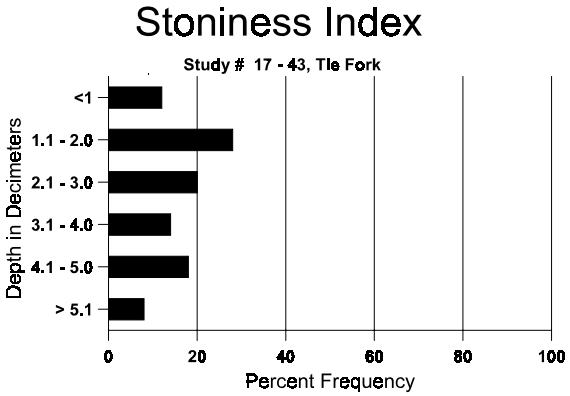
Species	Percent Cover '97	Point-Quarter Tree Data: Trees per Acre '97	Point-Quarter Tree Data: Average diameter (in) '97
Juniperus osteosperma	20.2	211	23.1
Pinus edulis	-	33	11.6
Quercus gambelii	8.6	N/A	N/A

BASIC COVER --
Herd unit 17 , Study no: 43

Cover Type	Nested Frequency '97	Average Cover % '83	'97
Vegetation	345	.50	31.01
Rock	53	4.00	1.14
Pavement	123	1.00	3.32
Litter	396	60.75	44.08
Cryptogams	148	1.50	4.92
Bare Ground	229	32.25	23.31

SOIL ANALYSIS DATA --
Herd Unit 17, Study no: 43, Tie Fork

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
17.8	43.8 (17.5)	7.3	55.4	20.7	23.8	4.4	8.7	339.2	.6



PELLET GROUP FREQUENCY --
Herd unit 17 , Study no: 43

Type	Quadrat Frequency '97
Rabbit	15
Elk	5
Deer	35

BROWSE CHARACTERISTICS --
Herd unit 17 , Study no: 43

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Amelanchier alnifolia																		
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
D	83	-	1	-	-	-	-	-	-	-	-	1	-	-	66			1
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	100%	00%	00%	-39%
'97	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'83	66	Dec:	100%
	'97	40		0%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata vaseyana																		
M	83	2	-	-	-	-	-	-	-	-	1	-	1	-	133	24	16	2
	97	4	-	-	-	-	-	-	-	-	4	-	-	-	80	20	29	4
D	83	-	3	-	-	-	-	-	-	-	-	-	3	-	200			3
	97	4	-	-	-	-	-	-	-	-	3	-	-	1	80			4
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	300			15

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	60%	00%	80%	-52%
'97	00%	00%	13%	

Total Plants/Acre (excluding Dead & Seedlings)				
'83	333	Dec:		60%
'97	160			50%

Cercocarpus montanus																		
M	83	-	4	4	-	-	-	-	-	-	8	-	-	-	533	39	33	8
	97	-	2	-	-	-	-	-	-	-	2	-	-	-	40	22	24	2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	50%	50%	00%	-92%
'97	100%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'83	533	Dec:		-
'97	40			-

Chrysothamnus depressus																		
S	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	23	-	-	-	-	-	-	-	-	23	-	-	-	460	7	14	23
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	
'97	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'83	0	Dec:		-
'97	500			-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Chrysothamnus viscidiflorus viscidiflorus																		
Y	83	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	97	14	-	-	-	-	-	-	-	-	14	-	-	-	280			14
M	83	20	-	-	-	-	-	-	-	-	20	-	-	-	1333	17	19	20
	97	115	-	-	-	-	-	-	-	-	115	-	-	-	2300	14	15	115
D	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	+44%
'97	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'83	1466	Dec:		0%
'97	2620			2%

Juniperus osteosperma																		
S	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
M	83	1	-	-	-	-	-	-	1	-	-	-	2	-	133	67	44	2
	97	18	-	-	-	-	-	-	-	-	18	-	-	-	360	-	-	18
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	100%	+67%
'97	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'83	133	Dec:		-
'97	400			-

Opuntia spp.																		
Y	83	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	97	5	-	-	-	-	-	-	-	-	5	-	-	-	100			5
M	83	5	-	-	-	-	-	-	-	-	5	-	-	-	333	3	12	5
	97	5	-	-	-	-	-	-	-	-	5	-	-	-	100	4	11	5

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	-50%
'97	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'83	399	Dec:		-
'97	200			-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Pinus edulis																		
S	83	3	-	-	-	-	-	-	-	-	3	-	-	-	200			3
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	83	3	-	-	-	-	-	-	-	-	3	-	-	-	200			3
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	-90%
'97	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'83	200	Dec:		-
'97	20			-

Quercus gambelii																		
S	83	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	97	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
Y	83	22	-	-	-	-	-	-	-	-	22	-	-	-	1466			22
	97	49	2	-	-	-	-	-	-	-	51	-	-	-	1020			51
M	83	2	9	-	18	9	-	-	-	-	35	-	3	-	2533	67	20	38
	97	106	2	-	-	-	-	-	-	-	108	-	-	-	2160	50	34	108
D	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	2	-	-	-	-	-	-	-	2	-	-	-	40			2
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	620			31

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	30%	00%	05%	-19%
'97	04%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'83	3999	Dec:		0%
'97	3220			1%

Rosa woodsii																		
Y	83	9	-	-	-	-	-	-	-	-	6	3	-	-	600			9
	97	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
M	83	1	-	-	-	-	-	-	-	-	-	1	-	-	66	17	12	1
	97	3	-	-	-	-	-	-	-	-	3	-	-	-	60	17	14	3

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	-82%
'97	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'83	666	Dec:		-
'97	120			-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Symphoricarpos oreophilus																		
S	83	3	-	-	-	-	-	-	-	-	3	-	-	-	200			3
	97	15	-	-	-	-	-	-	-	-	15	-	-	-	300			15
Y	83	77	-	-	-	-	-	-	-	-	77	-	-	-	5133			77
	97	78	-	-	-	-	-	-	-	-	78	-	-	-	1560			78
M	83	57	27	-	-	-	-	-	-	-	74	-	10	-	5600	21	16	84
	97	255	-	-	-	-	-	-	-	-	255	-	-	-	5100	16	24	255

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	17%	00%	06%	-38%
'97	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'83	10733	Dec:		-
'97	6660			-

Tetradymia canescens																		
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	-	2	-	-	-	-	-	-	-	2	-	-	-	40	8	10	2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	
'97	100%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'83	0	Dec:		-
'97	40			-